. . . connecting your business

LANCOM OAP-321

Outdoor access point with integrated antenna for high-performance wireless LAN links

- Ideal for high-performance outdoor wireless bridges compliant with 802.11n
- Integrated 5-GHz antenna with 2X2 MIMO for up to 17-dBi gain
- Reliable under extreme temperatures ranging from - 33°to + 70°
- Full control over configuration events thanks to TACACS+
- Gigabit connection with PoE as per 802.3af

LANCOM
Systems

The 802.11n-compliant LANCOM OAP-321 outdoor access point is designed for easy-to-set-up high-speed outdoor wireless bridges. The integrated 5-GHz antenna allows data rates that match cable-based broadband connections. It makes history of the labor-intensive process of installing and aligning an additional antenna! The LANCOM OAP-321 can be used to establish site-to-site connections over several kilometers. It is the right choice for wireless ISPs wishing to provide customers with a fast and dependable wireless connection. The unit provides maximum flexibility thanks to additional connections for external antennas in the 2.4-GHz and 5-GHz frequency ranges.

More Performance

The latest 802.11n WLAN standard and the multipath propagation of the integrated dual polarization antennas provide excellent results over 5-GHz wireless bridge links. 40-MHz channel bundling, which can be configured in LANconfig, provides an additional performance boost enabling transmission paths with high throughput rates over many kilometers. Information on the performance available with the LANCOM OAP-321 is provided by the LANCOM Antenna Distance Calculator: www.lancom.eu/Antenna-Distance-Calculator.

More simplicity.

The LANCOM OAP-321 makes it particularly easy to install powerful wireless transmission paths in the 5-GHz range. The device already has an integrated antenna, so there is no need to install and align an external antenna. The benefits of this are: There is no loss in antenna performance because there are no adapters or antenna cables to attenuate the signals and reduce wireless performance. This allows the full 17-dBI performance to be used for high throughput over several kilometers.

More Management.

A management system is vital outdoors where conditions are difficult, for example when it is difficult to see the LEDs on an access point mounted on a tall mast. The free LCMS LANCOM Management System allows the monitoring of all device functions and provides an overview of the entire network. It is possible to check whether the access points are transmitting and, if so, on which channels, how much data each one is sending, which clients are logged in and where, what encryption method is active, and a whole lot more.

Maximum control is also possible with regard to configuration: The access point supports TACACS+. Using the AAA protocol ("authentication, authorization, accounting") it is possible to track all activities relating to the configuration of the access point.

More Reliability for the Future.

LANCOM products stand for durability and dependability. For this reason we invest a great deal of time in designing our equipment and in corresponding quality assurance measures. With outdoor products we attach great importance to the right materials for housings and coatings. This enables LANCOM outdoor devices to resist the elements for many years. The hardware components inside our units are selected in such a way that there will be enough memory to accommodate future software versions without impacting performance. A LANCOM access point also guarantees a long life with regard to software: We provide updates several times a year for our LCOS operating system containing new features and improved functionality.

LANCOM OAP-321

Scope of features: as of LCOS version 8.5x

WLAN	
Frequency band 2.4 GHz or 5 GHz	2400-2483.5 MHz (ISM) or 5150-5825 MHz (depending on country-specific restrictions)
Antenna Gain	up to 17 dBI in 5 GHz possible with the integrated dual polarisation antenna
HPBW	Detailled information about the HPBW can be taken from the radio pattern below.
Data rates 802.11b/g	54 Mbps to IEEE 802.11g (fallback to 48, 36 , 24, 18, 12, 9, 6 Mbps, Automatic Rate Selection) compatible to IEEE 802.11b (11, 5.5, 2, 1 Mbps, Automatic Rate Selection), 802.11 b/g compatibility mode or pure g or pure b
Data rates 802.11a/ h	54 Mbps (fallback to 48, 36 , 24, 18, 12, 9, 6 Mbps, Automatic Rate Selection), fully compatible with TPC (adjustable power output) and DFS (automatic channel selection, radar detection) according to ETSI EN 301 893 V.1.5.1., EN 302 502
Data rates 802.11n	300 Mbps according to IEEE 802.11n with MSC15 (Fallback to 6,5 Mbps with MSC0)
Range (outdoor / P2P)	More than 20 km in 5 GHz. See our LANCOM Antenna Distance Calculator under www.lancom.de
Output power at radio module, 5 GHz	802.11a/h: 17 dBm @ 6 bis 24 Mbit/s, 15 dBm @ 36 Mbit/s, 13 dBm @ 54 Mbit/s, 802.11n: 17 dBm @ 6,5/13/30 Mbit/s (MCS0/8), 13 dBm @ 65/130/300 Mbit/s (MCS7/15)
Minimum transmission power	Transmission power reduction in software in 1 dB steps to min. 0.5 dBm
Receiver sensitivity 2.4 GHz	802.11b: -89 dBm @ 11 Mbit/s, -94 dBm @ 1 Mbit/s 802.11g: -93 dBm @ 6 Mbit/s, -79 dBm @ 54 Mbit/s 802.11n: -93 dBm @6,5 Mbit/s (MCS0/8), -75 dBm @ 65 Mbit/s (MCS7/15)
Receiver sensitivity 5 GHz	802.11a/h: -93 dBm @ 6Mbit/s, -75 dBm @ 54 Mbit/s 802.11n: -93 dBm @ 6,5 Mbit/s (MCS0/8), -71 dBm @ 65 Mbit/s (MCS7/15)
Radio channels 2.4 GHz	Up to 13 channels, max. 3 non-overlapping (2.4 GHz band)
Radio channels 5 GHz	Up to 26 non-overlapping channels (available channels and further obligations such as automatic DFS dynamic channel selection depending on national regulation)
Roaming	Seamless handover between radio cells, IAPP support with optional restriction to an ARF context, IEEE 802.11d support
WPA2 fast roaming	Pre-authentication and PMK caching for fast roaming
Fast client roaming	With background scanning, moving LANCOM 'client mode' access points pre-authenticate to alternative access points which offer a better signal before Roaming fails
VLAN	VLAN ID definable per interface, WLAN SSID, point-to-point connection and routing context (4094 IDs) IEEE 802.1q
Dynamic VLAN assignment	Dynamic VLAN assignment for target user groups based on MAC addresses, BSSID or SSID by means of external RADIUS server.
Q-in-Q tagging	Support of layered 802.1q VLANs (double tagging)
Multi-SSID	Simultaneous use of up to 8 independent WLAN networks per WLAN interface
IGMP snooping	Support for Internet Group Management Protocol (IGMP) in the WLAN bridge for WLAN SSIDs and LAN interfaces for specific switching of multicast packets (devices with integrated WLAN only). Automated detection of multicast groups. Configurable action for multicast packets without registration. Configuration of static multicast group members per VLAN ID. Configuration of query simulation for multicast membership per VLAN ID
Security	IEEE 802.11i / WPA2 with passphrase or 802.1x and hardware-accelerated AES, closed network, WEP64, WEP128, WEP152, user authentication, 802.1x /EAP, LEPS, WPA1/TKIP
RADIUS server	Integrated RADIUS server for MAC address list management
EAP server	Integrated EAP server for authentication of 802.1x clients via EAP-TLS, EAP-TTLS, PEAP, MSCHAP or MSCHAPv2
Quality of Service	Prioritization according to Wireless Multimedia Extensions (WME, subset of IEEE 802.11e)
U-APSD/WMM Power Save	Extension of power saving according to IEEE 802.11e by Unscheduled Automatic Power Save Delivery (equivalent to WMM Power Save). U-APSD supports the automatic switch of clients to a doze mode. Increasmed battery lifetime for telephone calls over VoWLAN (Voice over WLAN)
Bandwidth limitation	Maximum transmit and receive rates and an individual VLAN ID can be assigned to each WLAN client (MAC address)
Broken link detection	If the link of a chosen LAN interface breaks down, a WLAN module can be deactivated to let the associated clients search for a new base station
Background scanning	Detection of rogue AP's and the channel information for all WLAN channels during normal AP operation. The Background Scan Time Interval defines the time slots in which an AP or Router searches for a foreign WLAN network in its vicinity. The time interval can be specified in either milliseconds, seconds, minutes, hours or days
Client detection	Rogue WLAN client detection based on probe requests
802.1x supplicant	Authentication of an access point in WLAN client mode at another access point via 802.1x (EAP-TLS, EAP-TTLS and PEAP)
Layer-3 Tunneling	Layer-3 Tunneling in conformity with the CAPWAP standard allows the bridging of WLANs per SSID to a separate IP subnet. Layer-2 packets are encapsulated in Layer-3 tunnels and transported to a LANCOM WLAN controller. By doing this the access point is independent of the present infrastructure of the network. Possible applications are roaming without changing the IP address and compounding SSIDs without using VLANs.
*) Note	The effective distances and transmission rates that can be achieved are depending of the site RF conditions

LANCOM OAP-321

Scope of features: as of LCOS version 8.5x

IEEE 802.11n Features	
MIMO	MIMO technology is a technique which uses multiple transmitters to deliver multiple data streams via different spatial channels. LANCOM uses a 3 x 3 MIMO Configuration where 2 data streams are spread over 3 transmitters. Depending on the existing RF conditions the throughput is doubled with MIMO technology
40 MHz Channels	Two adjacent 20 MHz channels are combined to create a single 40 MHz channel. Depending on the existing RF Conditions channel bonding doubles the throughput.
MAC Aggregation and Block Acknowledgement	MAC Aggregation increase the 802.11 MAC efficiency by combining MAC data frames and sending it out with a single header. The receiver acknowledges the combined MAC frame with a Block Acknowledgement. Depending on existing RF conditions, this technique improves throughput by up to 20%.
Short Guard Interval	The guard interval is the time between OFDM symbols in the air. 802.11n gives the option for a shorter 400 nsec guard interval compared to the legacy 800 nsec guard interval. Under ideal RF conditions this increases the throughput by upto 10%
BFWA*	Support for Broadband Fixed Wireless Access in 5.8 GHz band with up to 4 Watt EIRP for WLAN point-to-point links according to the national regulations of your country, special antennas required
*) Note	The use of BFWA is subject to country specific regulation
WLAN operating modes	
WLAN access point	Infrastructure mode (autonomous operation or managed by LANCOM WLAN Controller)
WLAN bridge	Point-to-multipoint connection of up to 7 Ethernet LANs (mixed operation optional), broken link detection, blind mode, supports VLAN When configuring Pt-to-Pt links, pre-configured names can be used as an alternative to MAC Adresses for creating a link. Rapid spanning-tree protocol to support redundant routes in Ethernet networks
WLAN router	Use of the LAN connector for simultaneous DSL over LAN, IP router, NAT/Reverse NAT (IP masquerading) DHCP server, DHCP client, DHCP relay server, DNS server, PPPoE client (incl.Multi-PPPoE), PPTP client and server, NetBIOS proxy, DynDNS client, NTP, port mapping, policy-based routing based on routing tags, tagging based on firewall rules, dynamic routing with RIPv2, VRRP
WLAN client	Transparent WLAN client mode for wireless Ethernet extensions, e.g. connecting PCs or printers by Ethernet; up to 64 MAC addresses. Automatic selection of a WLAN profile (max. 8) with individual access parameters depending on signal strength or priority
Firewall	
Stateful inspection firewall	Incoming/Outgoing Traffic inspection based on connection information. Trigger for firewall rules depending on backup status, e.g. simplified rule sets for low-bandwidth backup lines. Limitation of the number of sessions per remote site (ID)
Packet filter	Check based on the header information of an IP packet (IP or MAC source/destination addresses; source/destination ports, DiffServ attribute); remote-site dependant, direction dependant, bandwidth dependant
Extended port forwarding	Network Address Translation (NAT) based on protocol and WAN address, i.e. to make internal webservers accessible from WAN
N:N IP address mapping	N:N IP address mapping for translation of IP addresses or entire networks
Tagging	The firewall marks packets with routing tags, e.g. for policy-based routing
Actions	Forward, drop, reject, block sender address, close destination port, disconnect
Notification	Via e-mail, SYSLOG or SNMP trap
Quality of Service	
Traffic shaping	Dynamic bandwidth management with IP traffic shaping
Bandwidth reservation	Dynamic reservation of minimum and maximum bandwidths, totally or connection based, separate settings for send and receive directions. Setting relative bandwidth limits for QoS in percent
DiffServ/TOS	Priority queuing of packets based on DiffServ/TOS fields
Packet-size control	Automatic packet-size control by fragmentation or Path Maximum Transmission Unit (PMTU) adjustment
Layer 2/Layer 3 tagging	Automatic or fixed translation of layer-2 priority information (802.11p-marked Ethernet frames) to layer-3 DiffServ attributes in routing mode. Translation from layer 3 to layer 2 with automatic recognition of 802.1p-support in the destination device
Security	
Intrusion Prevention	Monitoring and blocking of login attempts and port scans
IP spoofing	Source IP address check on all interfaces: only IP addresses belonging to the defined IP networks are allowed
Access control lists	Filtering of IP or MAC addresses and preset protocols for configuration access
Denial of Service protection	Protection from fragmentation errors and SYN flooding
General	Detailed settings for handling reassembly, PING, stealth mode and AUTH port
Password protection	Password-protected configuration access can be set for each interface
Alerts	Alerts via e-mail, SNMP-Traps and SYSLOG
Authentication mechanisms	EAP-TLS, EAP-TTLS, PEAP, MS-CHAP, MS-CHAPv2 as EAP authentication mechanisms, PAP, CHAP, MS-CHAP and MS-CHAPv2 as PPP authentication mechanisms

Security	
WLAN protocol filters	Limitation of the allowed transfer protocols, source and target addresses on the WLAN interface
Adjustable reset button	Adjustable reset button for 'ignore', 'boot-only' and 'reset-or-boot'
IP redirect	Fixed redirection of any packet received over the WLAN interface to a dedicated target address
High availability / redundancy	
VRRP	VRRP (Virtual Router Redundancy Protocol) for backup in case of failure of a device or remote station. Enables passive standby groups or reciprocal backup between multiple active devices including load balancing and user definable backup priorities
FirmSafe	For completely safe software upgrades thanks to two stored firmware versions, incl. test mode for firmware updates
Line monitoring	Line monitoring with LCP echo monitoring, dead-peer detection and up to 4 addresses for end-to-end monitoring with ICMP polling
Routing functions	
Router	IP and NetBIOS/IP multi-protocol router
Advanced Routing and Forwarding	Separate processing of 8 contexts due to virtualization of the routers. Mapping to VLANs and complete independent management and configuration of IP networks in the device, i.e. individual settings for DHCP, DNS, Firewalling, QoS, VLAN, Routing etc. Automatic learning of routing tags for ARF contexts from the routing table
HTTP	HTTP and HTTPS server for configuration by web interface
DNS	DNS client, DNS server, DNS relay, DNS proxy and dynamic DNS client
DHCP	DHCP client, DHCP relay and DHCP server with autodetection. Cluster of several LANCOM DHCP servers per context (ARF network) enables caching of all DNS assignments at each router. DHCP forwarding to multiple (redundant) DHCP servers
NetBIOS	NetBIOS/IP proxy
NTP	NTP client and SNTP server, automatic adjustment for daylight-saving time
Policy-based routing	Policy-based routing based on routing tags. Based on firewall rules, certain data types are marked for specific routing, e.g. to particular remote sites or lines
Dynamic routing	Dynamic routing with RIPv2. Learning and propagating routes; separate settings for LAN and WAN. Extended RIPv2 including HopCount, Poisoned Reverse, Triggered Update for LAN (acc. to RFC 2453) and WAN (acc. to RFC 2091) as well as filter options for propagation of routes. Definition of RIP sources with wildcards
Layer 2 functions	
ARP lookup	Packets sent in response to LCOS service requests (e.g. for Telnet, SSH, SNTP, SMTP, HTTP(S), SNMP, etc.) via Ethernet can be routed directly to the requesting station (default) or to a target determined by ARP lookup
LAN protocols	
IP	ARP, proxy ARP, BOOTP, DHCP, DNS, HTTP, HTTPS, IP, ICMP, NTP/SNTP, NetBIOS, PPPoE (server), RADIUS, RIP-1, RIP-2, RTP, SIP, SNMP, TCP, TFTP, UDP, VRRP, VLAN
WAN protocols	
Ethernet	PPPoE, Multi-PPPoE, ML-PPP, PPTP (PAC or PNS) and plain Ethernet (with or without DHCP), RIP-1, RIP-2, VLAN, IP
Interfaces	
LAN	10/100/1000 Mbps, IEEE 802.3af compliant
Serial interface	Serial configuration interface / COM port (10 pin plug): 19,200 - 115,000 baud
External antenna connectors	Two N connectors
LCMS (LANCOM Management System)	
LANconfig	Configuration program for Microsoft Windows, incl. convenient Setup Wizards. Optional group configuration, simultaneous remote configuration and management of multiple devices over IP connection (HTTPS, HTTP, TFTP). A tree view of the setting pages like in WEBconfig provides quick access to all settings in the configuration window. Password fields which optionally display the password in plain text and can generate complex passwords. Configuration program properties per project or user. Automatic storage of the current configuration before firmware updates. Exchange of configuration files between similar devices, e.g. for migrating existing configurations to new LANCOM products. Detection and display of the LANCOM managed switches. Extensive application help for LANconfig and parameter help for device configuration. LANCOM QuickFinder as search filter within LANconfig and device configurations that reduces the view to devices with matching properties
LANmonitor	Monitoring application for Microsoft Windows for (remote) surveillance and logging of the status of LANCOM devices and connections, incl. PING diagnosis and TRACE with filters and save to file. Search function within TRACE tasks. Wizards for standard diagnostics. Export of diagnostic files for support purposes (including bootlog, sysinfo and device configuration without passwords). Graphic display of key values (marked with an icon in LANmonitor view) over time as well as table for minimum, maximum and average in a separate window, e. g. for Rx, Tx, CPU load, free memory. Monitoring of the LANCOM managed switches. Flick easily through different search results by LANCOM QuickFinder

LCMS **(LANCOM Management System)**	
WLANmonitor	Monitoring application for Microsoft Windows for the visualization and monitoring of LANCOM WLAN installations, incl. Rogue AP and Rogue Client visualization. LANCOM QuickFinder as search filter that reduces the view to devices with matching properties
Firwall GUI	Graphical user interface for configuring the object-oriented firewall in LANconfig: Tabular presentation with symbols for rapid understanding of objects, choice of symbols for objects, objects for actions/Quality of Service/remote sites/services, default objects for common scenarios, individual object definition (e.g. for user groups)
Automatic software update	Voluntary automatic updates for LCMS. Search online for LCOS updates for devices managed by LANconfig on the myLANCOM download server (myLANCOM account mandatory). Updates can be applied directly after the download or at a later time
Management	
WEBconfig	Integrated web server for the configuration of LANCOM devices via Internet browsers with HTTPS or HTTP. Similar to LANconfig with a system overview, syslog and events display, symbols in the menu tree, quick access with side tabs. WEBconfig also features Wizards for basic configuration, security, Internet access, LAN-LAN coupling. Online help for parameters in LCOS menu tree
Alternative boot configuration	During rollout devices can be preset with project- or customer-specific settings. Up to two boot- and reset-persistent memory spaces can store customized configurations for customer-specific standard settings (memory space '1') or as a rollout configuration (memory space '2'). A further option is the storage of a persistent standard certificate for the authentication of connections during rollouts
Device Syslog	Syslog buffer in the RAM (size depending on device memory) to store events for diagnosis. Default set of rules for the event protocol in Syslog. The rules can be modified by the administrator. Display and saving of internal Syslog buffer (events) from LANCOM devices with LANmonitor, display only with WEBconfig
Access rights	Individual access and function rights for up to 16 administrators. Alternative access control on a per parameter basis with TACACS+
User administration	RADIUS user administration for dial-in access (PPP/PPTP). Support for RADSEC (Secure RADIUS) providing secure communication with RADIUS servers
Remote maintenance	Remote configuration with Telnet/SSL, SSH (with password or public key), browser (HTTP/HTTPS), TFTP or SNMP, firmware upload via HTTP/HTTPS or TFTP
TACACS+	Support of TACACS+ protocol for authentication, authorization and accounting (AAA) with reliable connections and encrypted payload. Authentication and authorization are separated completely. LANCOM access rights are converted to TACACS+ levels. With TACACS+ access can be granted per parameter, path, command or functionality for LANconfig, WEBconfig or Telnet/SSH. Each access and all changes of configuration are logged. Access verification and logging of SNMP Get and Set requests. WEBconfig supports the access rights of TACACS+ and choice of TACACS+ server at login. LANconfig provides a device login with the TACACS+ request conveyed by the addressed device. Authorization to execute scripts and each command within them by checking the TACACS+ server's database. CRON, action-table and script processing can be diverted to avoid TACACS+ to relieve TACACS+ servers. Redundancy by setting several alternative TACACS+ servers. Configurable option to fall back to local user accounts in case of connection drops to the TACACS+ servers. Compatibility mode to support several free TACACS+ implementations
Remote maintenance of 3rd party devices	A remote configuration for devices behind der LANCOM can be accomplished (after authentication) via tunneling of arbitrary TCP-based protocols, e.g. for HTTP(S) remote maintenance of VoIP phones or printers of the LAN. Additionally, SSH and Telnet client allow to access other devices from a LANCOM device with an interface to the target subnet if the LANCOM device can be reached at its command line interface
TFTP & HTTP(S) client	For downloading firmware and configuration files from a TFTP, HTTP or HTTPS server with variable file names (wildcards for name, MAC/IP address, serial number), e.g. for roll-out management. Commands for live Telnet session, scripts or CRON jobs. HTTPS Client authentication possible by username and password or by certificate
SSH & Telnet client	SSH-client function compatible to Open SSH under Linux and Unix operating systems for accessing third-party components from a LANCOM router. Also usable when working with SSH to login to the LANCOM device. Support for certificate- and password-based authentication. Generates its own key with sshkeygen. SSH client functions are restricted to administrators with appropriate rights. Telnet client function to login/administer third party devices or other LANCOM devices from command line interface
HTTPS Server	Option to choose if an uploaded certificate or the default certificate is used by the HTTPS server
Security	Access rights (read/write) over WAN or (W)LAN can be set up separately (Telnet/SSL, SSH, SNMP, HTTPS/HTTP), access control list
Scripting	Scripting function for batch-programming of all command-line parameters and for transferring (partial) configurations, irrespective of software versions and device types, incl. test mode for parameter changes. Utilization of timed control (CRON) or connection establishment and termination to run scripts for automation. Scripts can send e-mails with various command line outputs as attachments
Load commands	LoadFirmware, LoadConfig and LoadScript can be executed conditionally in case certain requirements are met. For example, the command LoadFirmware could be executed on a daily basis and check each time if the current firmware is up to date or if a new version is available. In addition, LoadFile allows the upload of files including certificates and secured PKCS-12 containers
SNMP	SNMP management via SNMPv2, private MIB exportable by WEBconfig, MIB II
Timed control	Scheduled control of parameters and actions with CRON service
Diagnosis	Extensive LOG and TRACE options, PING and TRACEROUTE for checking connections, LANmonitor status display, internal logging buffer for SYSLOG and firewall events, monitor mode for Ethernet ports
LANCOM WLAN Controller	Supported by all LANCOM WLAN Controller (separate optional hardware equipment for installation, optimization, operating and monitoring of WLAN networks, except for P2P connections)
SYSINFO	SYSINFO provides additional information. Hash value for the current configuration, time stamp of the last configuration change, a persistent counter of the number of configuration changes and the output of the value CONFIG_STATUS

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Scope of features: as of LCOS version 8.5x

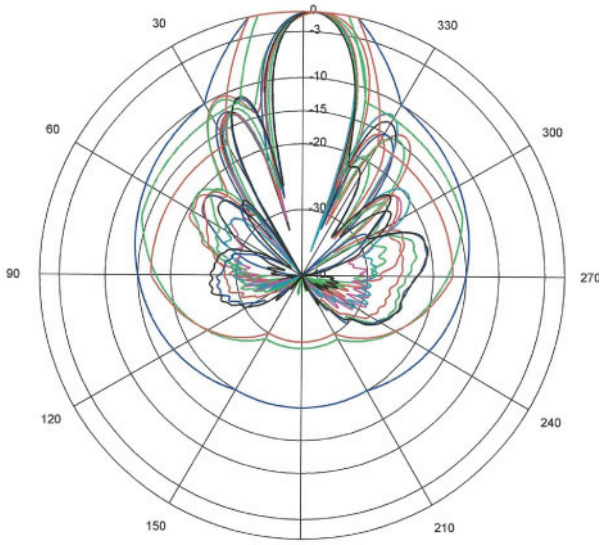
Statistics	
Statistics	Extensive Ethernet, IP and DNS statistics; SYSLOG error counter
Accounting	Connection time, online time, transfer volumes per station. Snapshot function for regular read-out of values at the end of a billing period. Timed (CRON) command to reset all counters at once
Export	Accounting information exportable via LANmonitor and SYSLOG
Hardware	
Dimensions	255 mm x 250 mm x 80 mm (LengthWidth/Height)
Weight	approximately 2.787 kg including pole mounting material
LED display	3 LEDs for Power, Ethernet and WLAN
Power supply	Via Power over Ethernet, compliant with IEEE 802.3af
Environment	-33°C to +70°C at 95% max. humidity (non condensing)
Housing	Robust metal housing, IP 66 protection rating, ready for wall and pole mounting, 3 LEDs for status display, please note: device must not be mounted in salt water environments without a suitable protective housing
Power consumption (max)	11 Watt, incl. PoE-Injector
Declarations of conformity	
CE	EN 301 489-1, EN 301 489-17, EN 60950
2.4 GHz WLAN	ETS 300 328
5 GHz WLAN	EN 301 893 version 1.5.1, EN 302 502 (BFWA)
Notifications	Certifications notified in Germany, Belgium, Netherlands, Luxembourg, Austria, Switzerland, UK, Italy, Spain, France, Portugal, Czech Republic, Denmark
Package content	
Manual	Hardware Overview (EN, DE), Installation Guide (DE/EN/FR/ES/IT/PT/NL)
CD/DVD	Data medium with firmware, management software (LANconfig, LANmonitor, WLANmonitor) and documentation
Reset plug	Plug for resetting the device via serial interface
Cable	Water-resistant, UV-resistant Ethernet PoE cable with water-resistant screw connector, 15m
Mounting Kit	Mounting kit for wall and pole mounting
Antennas	Two 3 dBi dipole dualband antennas
Power supply unit	Via Power over Ethernet, 1 x PoE Injector supplied
Support	
Warranty	3 years Support via Hotline and Internet KnowledgeBase
Software updates	Regular free updates (LCOS operating system and LANCOM Management System) via Internet
Options	
Advance Replacement	LANCOM Next Business Day Service Extension OAP, item no. 61412
Warranty Extension	LANCOM 2-Year Warranty Extension OAP, item no. 61415
Public Spot	LANCOM Public Spot Option (authentication and accounting software for hotspots, incl. Voucher printing through Standard PC printer), Item no. 60642.
Accessories	
LANCOM WLC-4006	LANCOM WLAN Controller for central management of 6 or 12 LANCOM access points and WLAN routers, item no. 61367
LANCOM WLC-4006 (UK)	LANCOM WLAN Controller for central management of 6 or 12 LANCOM access points and WLAN routers, item no. 61368 for UK
LANCOM WLC-4025+	LANCOM WLAN Controller for central management of 25 (opt. up to 100) LANCOM access points and WLAN routers, item no. 61378
LANCOM WLC-4025+ (UK)	LANCOM WLAN Controller for central management of 25 (opt. up to 100) LANCOM access points and WLAN routers, item no. 61379 for UK
LANCOM WLC-4100	LANCOM WLAN Controller for central management of 100 (opt. up to 1000) LANCOM access points and WLAN routers, item no. 61369
LANCOM WLC-4100 (UK)	LANCOM WLAN Controller for central management of 100 (opt. up to 1000) LANCOM access points and WLAN routers, item no. 61377 for UK
Adapter	AirLancer Adapter NP-NP 25 cm, connector for external LANCOM outdoor antennas, LANCOM item no. 61346
External antenna*	AirLancer Extender O-D80g 2.4 GHz 'dual linear' polarisation diversity outdoor sector antenna, item no. 61221
External antenna*	AirLancer Extender O-D60a 5 GHz 'dual linear' polarisation diversity outdoor sector antenna, item no. 61222
External antenna*	AirLancer Extender O-D9a 5 GHz 'dual linear' polarisation diversity outdoor antenna, item no. 61224

Accessories	
Antenna cable	AirLancer cable NJ-NP 3m antenna cable extension for connection with LANCOM outdoor antennas, item no. 61230
Antenna cable	AirLancer cable NJ-NP 6m antenna cable extension for connection with LANCOM outdoor antennas, item no. 61231
Antenna cable	AirLancer cable NJ-NP 9m antenna cable extension for connection with LANCOM outdoor antennas, item no. 61232
Surge arrestor (antenna cable)	AirLancer Extender SA-5L surge arrestor (2.4 and 5 GHz), to be integrated between Access Point and antenna, item no. 61553
Surge arrestor (LAN cable)	AirLancer Extender SA-LAN surge arrestor (LAN cable), item no. 61213
Documentation	LANCOM LCOS Reference Manual (DE), item no. 61700
*) Note	The Polarization Diversity antennas require 2 cables and surge arrestors
Item numbers	
LANCOM OAP-321	61538
LANCOM OAP-321 Bridge Kit	61541

Antenna pattern of the integrated antenna

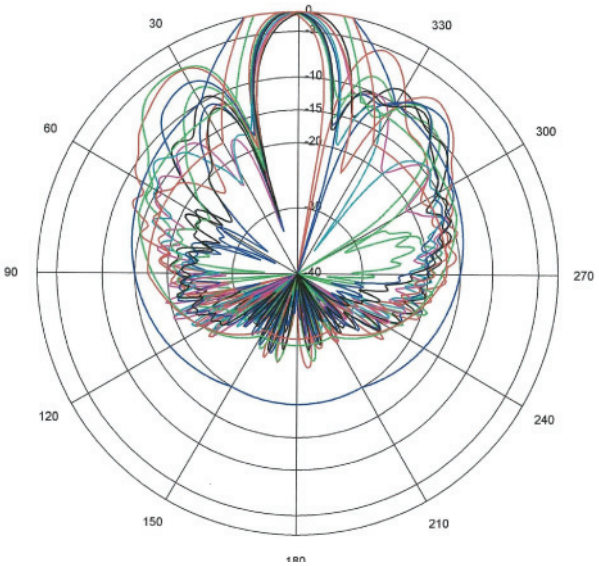
Horizontal Port, E-Plane, Co-Polarization

Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	14,1	18,4
4,990	15,1	18,2
5,150	18,8	16,6
5,250	18,6	16,0
5,350	18,1	15,6
5,400	17,6	15,5
5,600	17,6	15,8
5,725	18,7	15,0
5,850	17,6	14,0
5,875	17,9	14,0



Horizontal Port, E-Plane, Cross-Polarization

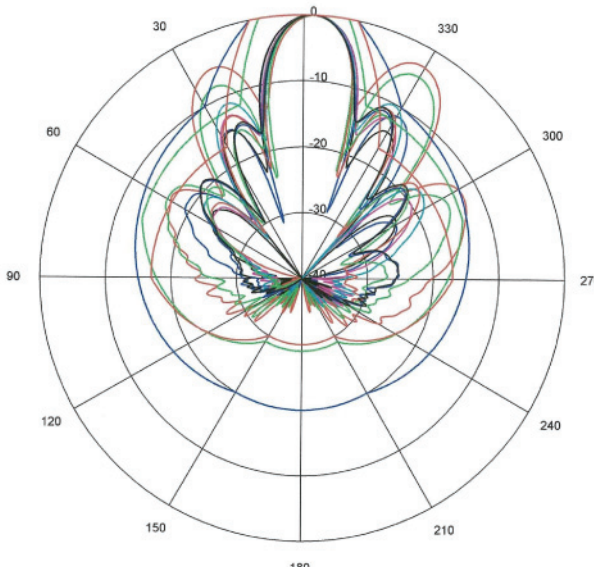
Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	3,0	13,3
4,990	3,3	13,9
5,150	6,0	15,7
5,250	4,7	16,2
5,350	3,6	15,8
5,400	2,7	15,2
5,600	1,8	15,6
5,725	6,9	14,5
5,850	4,0	14,0
5,875	3,9	14,0



Antenna pattern of the integrated antenna

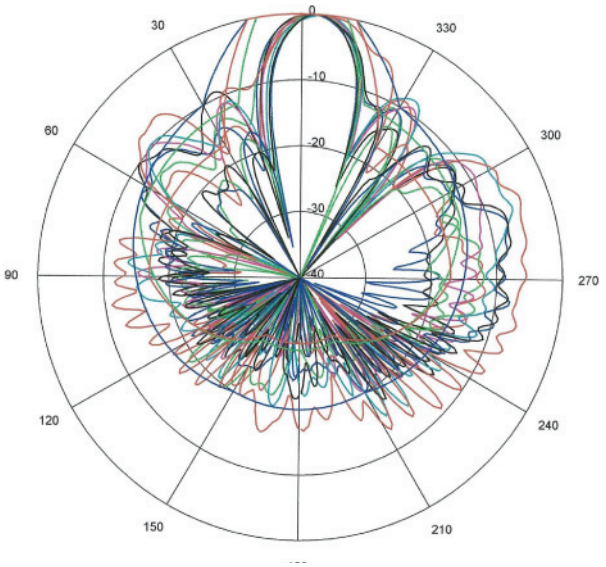
Horizontal Port, H-Plane, Co-Polarization

Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	13,6	14,5
4,990	14,7	14,8
5,150	18,5	17,0
5,250	18,4	17,0
5,350	17,8	16,3
5,400	17,4	15,4
5,600	17,2	15,1
5,725	18,3	15,3
5,850	17,3	15,4
5,875	17,6	15,1



Horizontal Port, H-Plane, Cross-Polarization

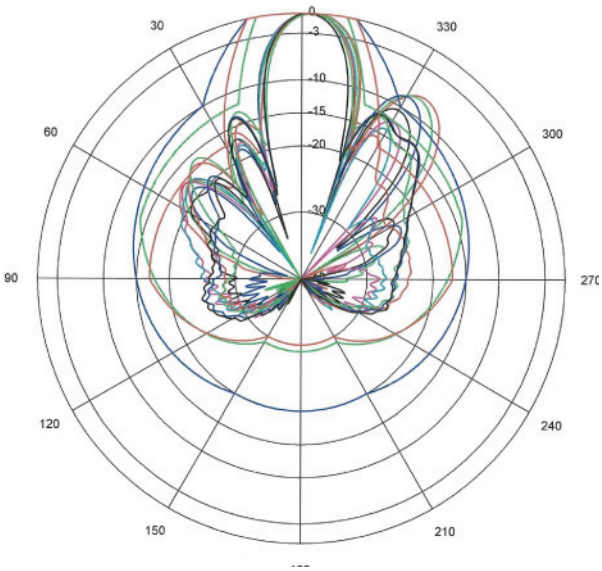
Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	-3,5	17,4
4,990	-4,2	17,4
5,150	-1,7	17,4
5,250	-3,7	17,3
5,350	-4,9	17,8
5,400	-7,0	16,6
5,600	-11,1	20,7
5,725	0,9	15,3
5,850	-5,0	14,8
5,875	-5,3	15,6



Antenna pattern of the integrated antenna

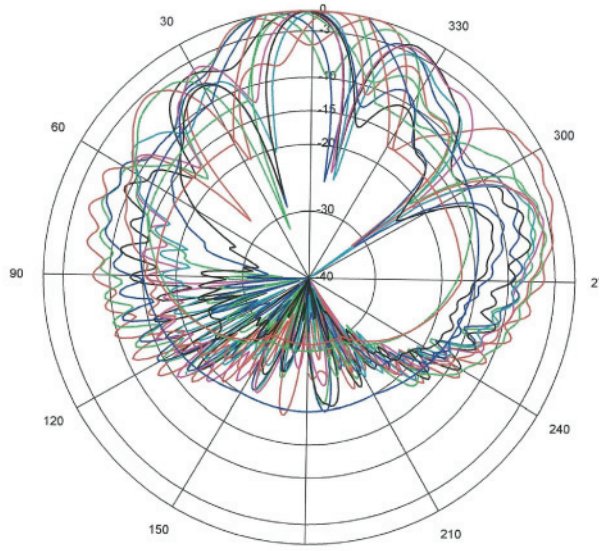
Vertical Port, E-Plane, Co-Polarization

Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	17,3	17,5
4,990	17,9	17,2
5,150	18,9	16,7
5,250	18,4	16,5
5,350	17,8	16,6
5,400	17,6	16,7
5,600	17,1	15,3
5,725	18,1	14,6
5,850	17,0	14,5
5,875	17,2	14,4



Vertical Port, E-Plane, Cross-Polarization

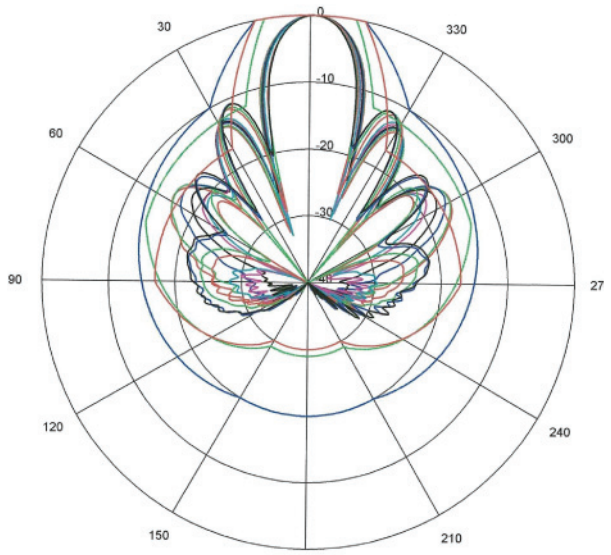
Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	-5,6	16,9
4,990	-2,8	19,1
5,150	-2,5	21,7
5,250	-3,3	18,4
5,350	-4,4	14,4
5,400	-3,0	13,6
5,600	-3,2	12,5
5,725	-2,5	17,3
5,850	-0,1	15,0
5,875	1,3	14,5



Antenna pattern of the integrated antenna

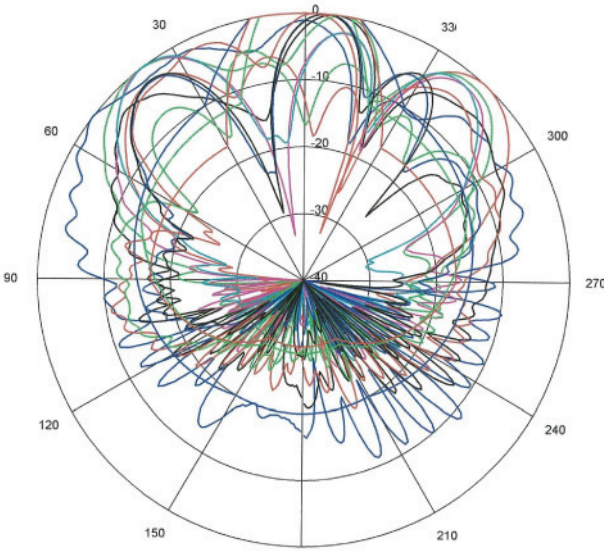
Vertical Port, H-Plane, Co-Polarization

Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	17,1	17,9
4,990	17,7	17,8
5,150	18,7	17,6
5,250	18,4	17,1
5,350	17,7	16,7
5,400	17,6	16,5
5,600	17,0	15,7
5,725	17,9	15,2
5,850	16,9	15,1
5,875	17,2	15,0



Vertical Port, H-Plane, Cross-Polarization

Frequency [GHz]	Gain [dBi]	Beam width [°]
4,940	4,2	23,4
4,990	0,4	27,2
5,150	-9,6	42,8
5,250	-5,1	16,4
5,350	-1,0	21,7
5,400	1,9	22,2
5,600	-5,7	15,1
5,725	-3,0	15,1
5,850	-1,3	15,2
5,875	0,0	14,6



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